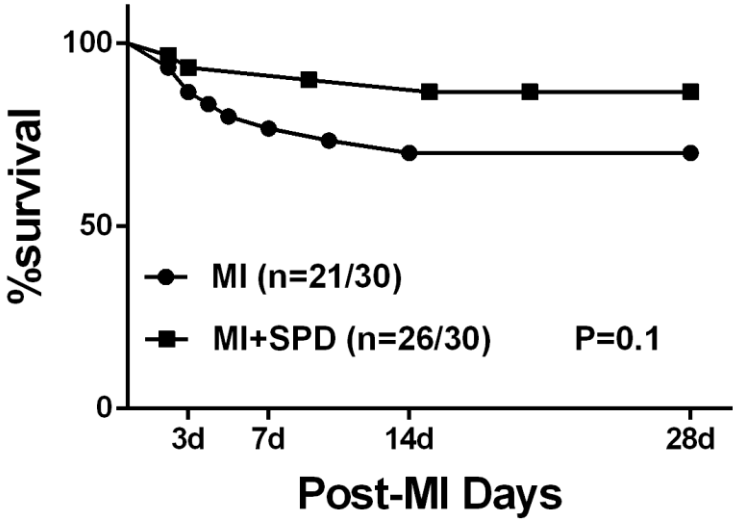
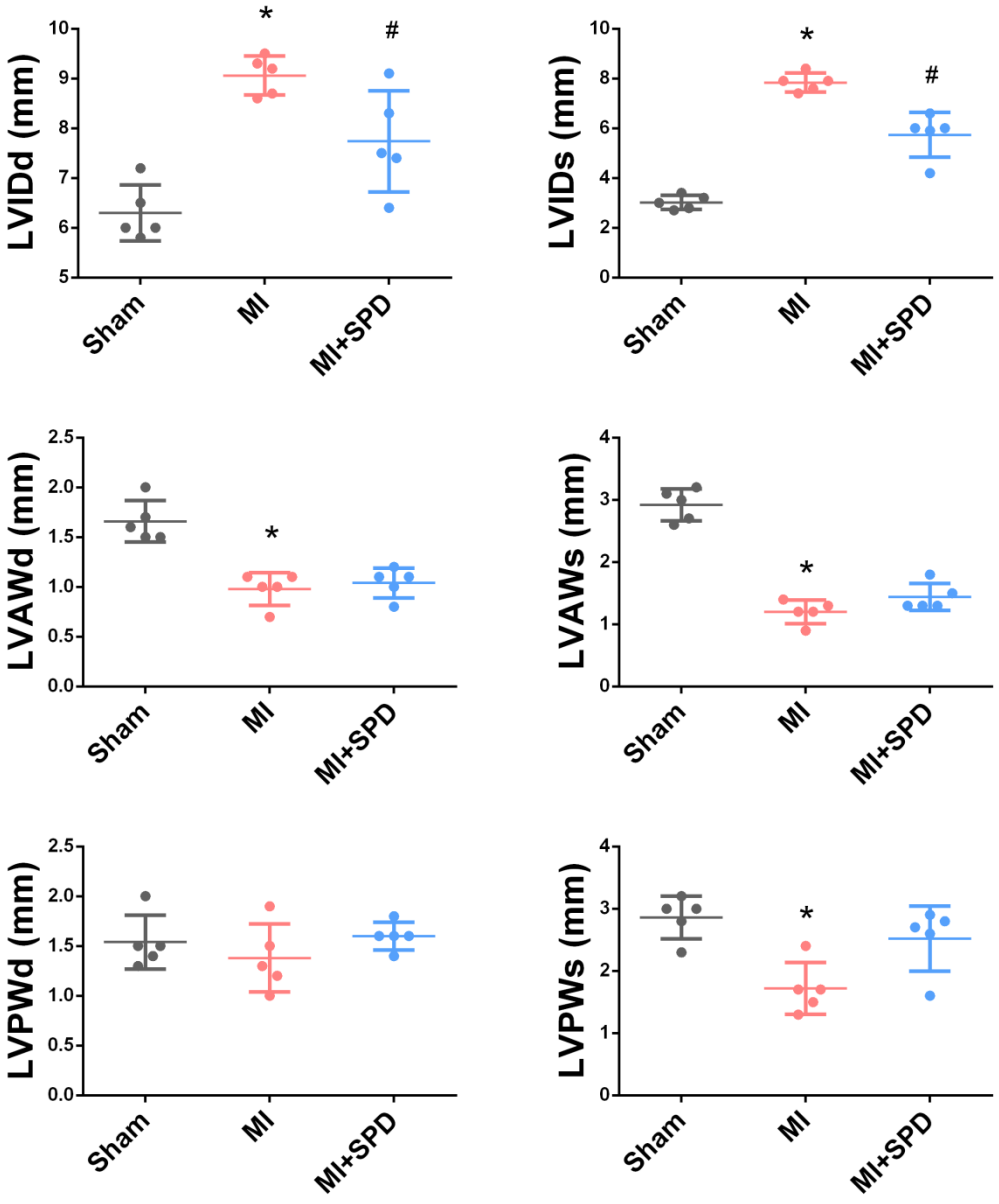
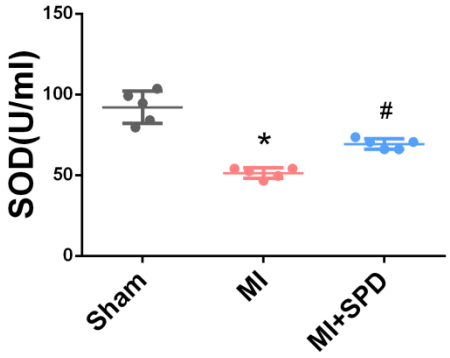
S1

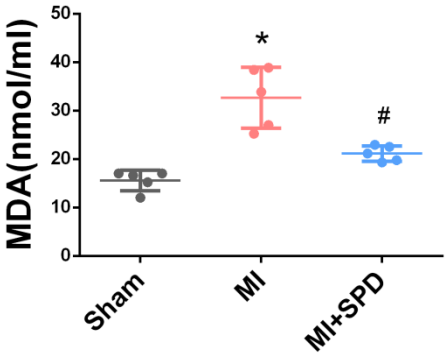

100
50
0
%survival
MI (n=21/30)
MI+SPD (n=26/30)
P=0.1
3d
7d
14d
28d
Post-MI Days

S2

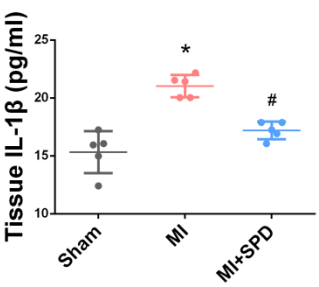

LVIDd (mm)
LVIDs (mm)
LVAWd (mm)
LVAWs (mm)
LVPWd (mm)
LVPWs (mm)
Sham
MI
MI+SPD
*
#

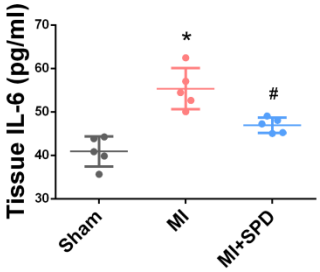
S3

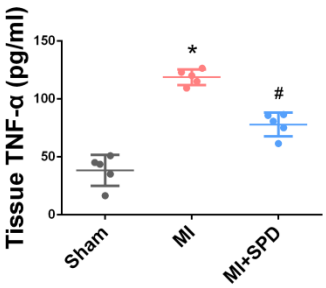

SOD(U/ml)
150
100
50
0
*
#
Sham
MI
MI+SPD


MDA(nmol/ml)
50
40
30
20
10
0
*
#
Sham
MI
MI+SPD

S4


Tissue IL-1β (pg/ml)
25
20
15
10
*
#
Sham
MI
MI+SPD


Tissue IL-6 (pg/ml)
70
60
50
40
30
*
#
Sham
MI
MI+SPD


Tissue TNF-α (pg/ml)
150
100
50
0
*
#
Sham
MI
MI+SPD

S5

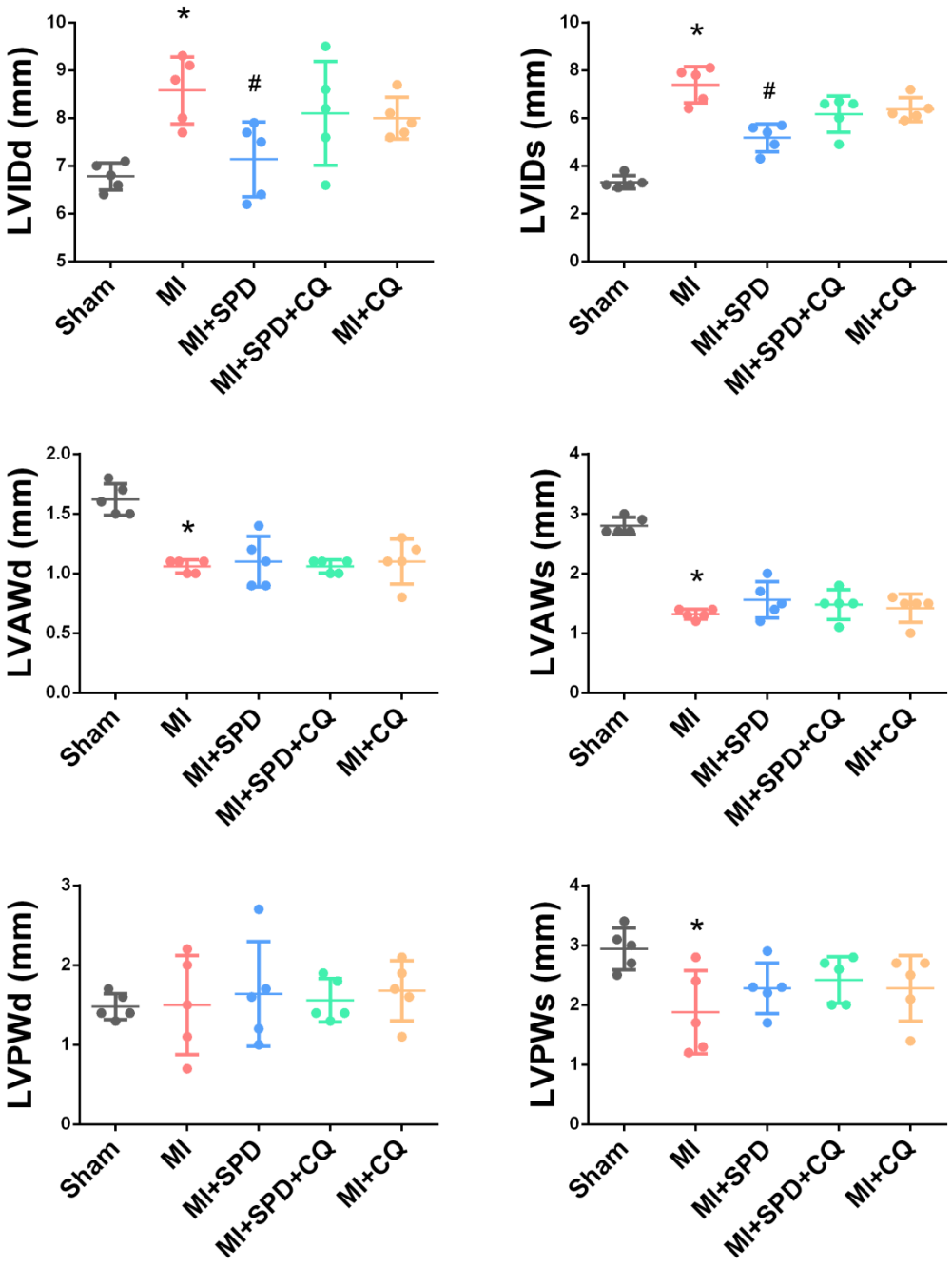

LVIDd (mm)
LVIDs (mm)
LVAWd (mm)
LVAWs (mm)
LVPWd (mm)
LVPWs (mm)
Sham
MI
MI+SPD
MI+SPD+CQ
MI+CQ
*
#

Figure S1. Survival analysis of rats with or without SPD after MI. n=30 per group. All rats in Sham group survived.

Figure S2. Echocardiography parameters were measured in each group, including left ventricular (LV) internal diameters at diastole (LVIDd; in mm), LV internal diameters at systole (LVIDs; in mm), LV anterior wall thickness at diastole (LVAWd; in mm), LV anterior wall thickness at systole (LVAWs; in mm), LV posterior wall thickness at diastole (LVPWd; in mm), LV posterior wall thickness at systole (LVPWs; in mm). n=5, $^{*}P < 0.05$ versus sham group, $^{\#}P < 0.05$ versus MI group.

Figure S3. Measurement and quantitative analysis of SOD and MDA in rat heart tissues. n=5, $^{*}P < 0.05$ versus sham group, $^{\#}P < 0.05$ versus MI group.

Figure S4. Measurement and quantitative analysis of inflammatory cytokines in rat heart tissues. n=5, $^{*}P < 0.05$ versus sham group, $^{\#}P < 0.05$ versus MI group.

Figure S5. Echocardiography parameters were measured in each group, including left ventricular (LV) internal diameters at diastole (LVIDd; in mm), LV internal diameters at systole (LVIDs; in mm), LV anterior wall thickness at diastole (LVAWd; in mm), LV anterior wall thickness at systole (LVAWs; in mm), LV posterior wall thickness at diastole (LVPWd; in mm), LV posterior wall thickness at systole (LVPWs; in mm). n=5, $^{*}P < 0.05$ versus sham group, $^{\#}P < 0.05$ versus MI group.

Supplementary Methods

1.Antibodies information

The detailed information on antibodies used for Western Blotting has been summarized as followed.

Name	Source	cat#	RRID
rabbit-anti-LC3B	Cell Signaling Technology	2775S	AB_915950
rabbit-anti-p62	Cell Signaling Technology	5114S	AB_10624872
rabbit-anti-Bcl2	Cell Signaling Technology	2876S	
rabbit-anti-Bax	Cell Signaling Technology	2772S	AB_10695870
rabbit-anti-Caspase3	Cell Signaling Technology	9662S	AB_331439
rabbit-anti-AMPKα	Cell Signaling Technology	2532S	AB_330331
rabbit-anti-Phospho-AMPKα(Thr172)	Cell Signaling Technology	2535S	AB_331250
rabbit-anti-mTOR	Cell Signaling Technology	2972S	AB_330978
rabbit-anti-Phospho-mTOR(Ser2448)	Cell Signaling Technology	5536S	AB_10691552
rabbit-anti-GAPDH	Bioworld Technology	AP0063	AB_2651132

2.Grouping design for eliminating physiological differences

In order to rule out the influence of individual differences, all male rats with 6-8 week-old were enrolled in our experiment. Rats in same experiment were purchased from Southern Medical University with one batch. Three batches of rats have been used in our research. The weights of each rat were estimated. In addition, completely randomized grouping design was used to reduce the physiological individual differences. No differences in gender, age and weights were shown among each group. The mean weights of each groups as below：

Table 1 Weights of the 1st batch（mean±SD）

Group	Number	Weight(g)
Sham	6	207.8±6.5
MI	8	208.3±4.9
MI+SPD	8	207.4±6.8

Table 2 Weights of the 2nd batch（mean ±SD）

Group	Number	Weight(g)
Sham	6	209.8±4.4
MI	8	209.3±5.9
MI+SPD	8	210.4±5.7
MI+SPD+CQ	8	210.8±4.8
MI+CQ	8	211.4±6.2

Table 3 Weights of the 3rd batch（mean ±SD）

Group	Number	Weight(g)
Sham	5	210.8±5.8
MI	8	211.0±5.6
MI+SPD	8	208.9±6.4
MI+SPD+Comp C	8	209.9±7.2

3.Post-surgical handling and analgesia and sacrifice

Penicillin was used to prevent infection, tramadol (intraperitoneal injection) was used for analgesia post-surgery under the direction of medication specification. In order to improve the living environment post ligation, all cages and foods as well as drinking water were sterilized with ultraviolet light. Animals were sacrificed by carbon dioxide inhalation as the rats were put into an aeration cage filled with CO2 for 1-3 minutes and then died.

4.Post-surgical survival rate of rats

Three batches of rats have been used in our research and the survival rate of each batch has been attached as bellow:

Table 1 The detail survival information of the 1st batch

Number	Groups	Days of survival	Outcomes
1	Sham	28	survive
2	Sham	28	survive
3	Sham	28	survive
4	Sham	28	survive
5	Sham	28	survive
6	Sham	28	survive
7	MI group	28	survive

8	MI group	3	die
9	MI group	28	survive
10	MI group	28	survive
11	MI group	28	survive
12	MI group	10	die
13	MI group	28	survive
14	MI group	28	survive
15	MI+SPD group	28	survive
16	MI+SPD group	28	survive
17	MI+SPD group	28	survive
18	MI+SPD group	28	survive
19	MI+SPD group	4	die
20	MI+SPD group	28	survive
21	MI+SPD group	28	survive
22	MI+SPD group	28	survive

Table 2 The detail survival information of the 2nd batch

Number	Groups	Days of survival	Outcomes
1	Sham	28	survive
2	Sham	28	survive
3	Sham	28	survive
4	Sham	28	survive
5	Sham	28	survive
6	Sham	28	survive
7	MI group	17	die
8	MI group	2	die
9	MI group	28	survive
10	MI group	28	survive
11	MI group	28	survive
12	MI group	28	survive
13	MI group	28	survive
14	MI group	7	die
15	MI+SPD group	12	die
16	MI+SPD group	28	survive
17	MI+SPD group	28	survive
18	MI+SPD group	28	survive
19	MI+SPD group	28	survive
20	MI+SPD group	28	survive
21	MI+SPD group	28	survive
22	MI+SPD group	28	survive
23	MI+SPD+CQ group	28	survive
24	MI+SPD+CQ group	28	survive
25	MI+SPD+CQ group	3	die
26	MI+SPD+CQ group	28	survive

27	MI+SPD+CQ group	9	die
28	MI+SPD+CQ group	28	survive
29	MI+SPD+CQ group	28	survive
30	MI+SPD+CQ group	28	survive
31	MI+CQ group	28	survive
32	MI+CQ group	28	survive
33	MI+CQ group	28	survive
34	MI+CQ group	28	survive
35	MI+CQ group	28	survive
36	MI+CQ group	28	survive
37	MI+CQ group	2	die
38	MI+CQ group	5	die

Table 3 The detail survival information of the 3rd batch

Number	Groups	Days of survival	Outcomes
1	Sham	28	survive
2	Sham	28	survive
3	Sham	28	survive
4	Sham	28	survive
5	Sham	28	survive
6	MI group	28	survive
7	MI group	28	survive
8	MI group	2	die
9	MI group	28	survive
10	MI group	28	survive
11	MI group	28	survive
12	MI group	28	survive
13	MI group	11	die
14	MI+SPD group	3	die
15	MI+SPD group	28	survive
16	MI+SPD group	28	survive
17	MI+SPD group	15	die
18	MI+SPD group	28	survive
19	MI+SPD group	28	survive
20	MI+SPD group	28	survive
21	MI+SPD group	28	survive
22	MI+SPD+Comp C group	28	survive
23	MI+SPD+Comp C group	28	survive
24	MI+SPD+Comp C group	28	survive
25	MI+SPD+Comp C group	28	survive
26	MI+SPD+Comp C group	28	survive
27	MI+SPD+Comp C group	4	die
28	MI+SPD+Comp C group	28	survive
29	MI+SPD+Comp C group	8	die

5.Stability of animal model

In order to ensure the stability of animal model, several measures were taken as followed: 1) Experimental rats were from one batch and the LAD ligation surgery was operated by one experienced and professional surgeon at the same period; 2) the ligation site was strictly limited at 2mm far from the lower margin of left auricle and ischemia features, including the color of infarcted region turned from red to pale and heart rates slowed were obviously shown; 3) After ligation, ECG were performed immediately to ensure the elevation of ST segment; 4) In our pre-experiment, echocardiographic and Masson staining were performed in some rats to estimate the equivalence of cardiac systolic function and infarction size after ligation and the results revealed that equivalence between each rats, which demonstrated that our animal models were stable.

In conclusion, it is reasonable for us to confirm that the area at risk in all the rats is equivalent between groups.

6.Administration method of SPD

First of all, the administration method of SPD was based on two related literatures *(Michiels C, Kurdi A, Timmermans J, Atherosclerosis*; *Eisenberg T, Abdellatif M, Schroeder S, Nat.Med)*, in which SPD was dissolved into drinking water and all rats were given sufficient and free drinking water. According to the research of the *Eisenberg et al Nature Medicine 2016*, after given adequate drinking water with 3mM SPD for 2 weeks, rats' plasma levels of SPD remained in a stable range and significantly higher than those with regular water. Therefore, we believed that SPD supplement by given sufficient and free drinking water can make each rat maintain a relatively stable SPD plasma concentration which is also the effective concentration. Secondly, in our pre-experiment, we have estimated the average daily water intake of each rat by using metabolic cages and the results revealed that the general water intake of each rat was almost the same, namely around 50 ml/day. Taken together, these results suggested that after given free drinking water with SPD, the plasma

levels of SPD in rats would maintain a stable range and exerted effects.

According to the findings of *Martinet W et al Atherosclerosis 2016* in which 5mM SPD in drinking water for mice 4 weeks exerts protection in vascular disease. In our study, SPD supplement period is 4 weeks which was consistent with that in *Martinet W et al Atherosclerosis 2016*. Therefore, we decided to use 5mM SPD to perform the study.